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Correct

wherein the second positioning device includes a first actuator that positions the mask stage over a comparatively small movement parallel to the first direction, and a second actuator that positions the mask stage over a comparatively large movement parallel to the first direction, the first actuator being driven at least when the second actuator is being at least one of accelerated and decelerated.

REMARKS

Claims 26-94 and 97-104 are pending. By this Amendment, claims 26, 46 and 54 are amended to address the rejections under 35 U.S.C. §112, second paragraph, and claims 11-25, 95 and 96 are cancelled. Additionally, the specification is amended to correct an obvious typographical error therein.

The Office Action made the restriction requirement with respect to claims 11-25, 95 and 96 final, and apparently withdrew those claims from further consideration. Non-elected claims 11-25, 95 and 96 are cancelled. Applicant reserves the right to file one or more divisional applications directed to those claims.

As a result of the cancellation of claims 11-25, 95 and 96, the inventorship of this application is amended to delete Toshiya OHTOMO. A Request to Amend Inventorship under 37 C.F.R. §1.48(b) (this rule was amended November 7, 2000) is attached hereto in order to affect the change in inventorship.

The Office Action objected to the drawings under 37 C.F.R. §1.83(a). The subactuators recited in claims 37, 45, 53, 58, 65, 70, 75, 82, 87 and 94 are shown in the drawings. For example, with reference to Fig. 5, actuators 39A and 39B are two parallelly arranged subactuators that drive the fine adjustment stage 8 in the Y-direction, and actuators 42A and 42B are two parallelly arranged subactuators that drive the fine adjustment stage 8 in the X-direction. With respect to claims 28, 48, 59, 61, 76, 77 and 89, Applicant respectfully

submits that it is not necessary to provide a separate drawing illustrating a substrate (or wafer) stage driven by the claimed first and second electromagnetic actuators because that drawing would be identical to Fig. 5. Unlike a reticle stage, a wafer stage does not require a central aperture. However, the central aperture is not illustrated in the reticle stage of Fig. 5. Thus, one of ordinary skill in the art would not require a separate drawing, that will look exactly the same as Fig. 5, to understand application of the claimed invention to a substrate stage.

Withdrawal of the drawing objection is earnestly solicited.

The informality on page 28, line 5 of the specification has been corrected. The Examiner is thanked for identifying the informality.

The Office Action rejected claims 28, 37, 45, 48, 53, 58-65, 70, 75-82, 87, 89, 94, 99 and 100 under 35 U.S.C. §112, first paragraph. This rejection is respectfully traversed.

With respect to claims 28, 48, 59, 61, 76, 77 and 89, a substrate mounted on the fine adjustment stage is described in the original specification at, for example, page 30, lines 3-5 and page 43, lines 17-20, and in original claim 3. With respect to claims 37, 45, 53, 58, 65, 70, 75, 82, 87 and 94, the subactuators are disclosed in the specification. For example, as describe above, actuators 39A and 39B correspond to a pair of subactuators. Additionally, actuators 42A and 42B correspond to a pair of subactuators. Also see, for example, page 4, lines 8-11, page 6, lines 10-12, page 23, lines 10-16, page 24, lines 13-18 and original claim 10. Accordingly, withdrawal of the rejection under 35 U.S.C. §112, first paragraph, is earnestly solicited.

Claims 26-29, 37, 45-65, 70, 75-82, 87, 89, 94 and 97-100 stand rejected under 35 U.S.C. §112, second paragraph. This rejection is respectfully traversed.

Claims 26 and 46 have been amended to overcome the rejection with respect to "scanning an object of scanning". Claim 54 has been amended to overcome the antecedent basis rejection with respect to "the following," although Applicant respectfully submits that the original wording was clear in spite of using the word "the."

As described above with respect to the rejection under 35 U.S.C. §112, first paragraph, the specification describes mounting of a substrate on the fine adjustment stage, and the use of a pair of subactuators. Accordingly, claims 28, 37, 45, 48, 53, 58, 59, 61, 65, 70, 75-77, 82, 87, 89 and 94 have antecedent basis support in the disclosure.

Accordingly, withdrawal of the 35 U.S.C. §112, second paragraph, rejection is earnestly solicited.

Claims 26-94 and 97-104 stand provisionally rejected under the judicially created doctrine of obviousness-type double patenting over claims 1-10 and 24-68 of U.S. Patent Application No. 09/227,184 (now issued as U.S. Patent No. 6,124,923). Applicant notes that claims 50-68 were canceled in an Amendment filed under 37 C.F.R. §1.312(a) in the related Application No. 09/227,184, rendering the reference to claims 50-68 moot. Additionally, claims 30, 38, 54, 66, 71, 76, 83 and 88-90 stand rejected under the judicially created doctrine of obviousness-type double patenting over claims 1 and 2 of U.S. Patent No. 5,850,280, and claims 26-29, 31-37, 39-53, 55-65, 67-70, 72-75, 77-82, 84-87, 91-94 and 97-104 stand rejected under the judicially created doctrine of obviousness-type double patenting over claims 1 and 2 of U.S. Patent No. 5,850,280 in view of U.S. Patent No. 4,916,340 to Negishi. These rejections are moot in view of the enclosed Terminal Disclaimer.

Claims 26-94 and 97-104 stand rejected under 35 U.S.C. §103(a) over U.S. Patent No. 5,477,304 to Nishi in view of Negishi. This rejection is respectfully traversed.

I. INDEPENDENT CLAIMS 26 AND 46

Independent claim 26 recites "a cooling unit that cools said actuators [that drive the fine adjustment stage] by circulating a predetermined cooling fluid, said cooling unit circulating said cooling fluid from a portion near an optical path of the light beam from said interferometer toward a distant portion." Independent claim 46 recites "a cooling unit that cools said actuators [that drive the fine adjustment stage] by circulating a predetermined cooling fluid, said cooling unit circulating said cooling fluid from said actuators arranged in the direction perpendicular to said scanning direction with respect to said scanning stage for driving said fine adjustment stage."

Applicant respectfully submits that Nishi and Negishi, alone or combined, do not suggest the combination of features recited in independent claims 26 and 46. At col. 9, lines 20-24, Nishi discloses providing a cooling function for the scanning stage 20 (i.e., the stage upon which the fine adjustment stage 21 is mounted). However, Nishi does not disclose or suggest providing a cooling unit that cools the actuators of the fine adjustment stage as recited in claims 26 and 46.

Negishi does not add anything to the teachings of Nishi. That is, although Negishi discloses a cooling unit, the Negishi cooling unit is not for the actuators of a fine adjustment stage that moves with respect to a scanning stage as recited in claims 26 and 46. Accordingly, the teachings of Nishi and Negishi taken together do not suggest providing a cooling unit for the actuators of a fine adjustment stage that moves with respect to a scanning stage. Negishi merely discloses a cooling structure for a scanning stage such as the scanning stage 20 of Nishi. Accordingly, claims 26 and 46 are patentable over the combination of Nishi and Negishi.

II. INDEPENDENT CLAIMS 30 AND 38

Independent claim 30 recites: (1) "a first actuator that drives said second stage with a second thrust in said second direction [the second direction being perpendicular to a first direction in which a first stage linearly moves] with respect to said first stage" and (2) "a second actuator that drives said second stage with a first thrust in said first direction with respect to said first stage, said first thrust being larger than said second thrust." Independent claim 38 is similar to independent claim 30, but recites that "said first thrust being different from said second thrust", rather than being "larger than said second thrust."

Nishi does not disclose or suggest driving stage 21 with different thrusts applied to actuator 38, 40 and 42. Accordingly, Nishi does not disclose or suggest the first and second actuators of claims 30 and 38, which apply different thrusts in the different directions.

Negishi does not remedy this deficiency of Nishi.

Accordingly, the combination of Nishi and Negishi does not disclose or suggest the features recited in independent claims 30 and 38.

III. INDEPENDENT CLAIMS 54, 59, 66, 71, 76, 83 AND 88

These claims recite that a first actuator (or an actuator), which moves a stage (or a fine adjustment stage, or a second stage) over a comparatively small movement in a first direction (or a scanning direction), is driven when a second actuator (or a scanning stage or a first stage), which drives the stage over a comparatively large movement in the first direction (or the scanning direction), is being accelerated or decelerated.

Nishi does not disclose or suggest such features. Nishi does not indicate that the actuators 38, 40 and 42 are driven while stage 20 is being accelerated or decelerated. Nishi only discloses driving the actuators 38, 40 and 42 when the scanning stage 20 is driven at a

constant speed. See, for example, the Fig. 4 flowchart, and col. 11, line 47 - col. 13, line 6 and col. 13, lines 32-35. Negishi does not overcome the deficiencies of Nishi.

Accordingly, Nishi and Negishi combined do not disclose or suggest the features recited in independent claims 54, 59, 66, 71, 76, 83 and 88.

The various dependent claims are patentable at least in view of their dependence on the independent claims.

In view of the foregoing, Applicant respectfully submits that this application is in condition for allowance. Favorable consideration and prompt allowance are earnestly solicited.

Should the Examiner believe anything further would be desirable to place this application in even better condition for allowance, the Examiner is invited to contact Applicant's undersigned attorney at the telephone number listed below.

Respectfully submitted,



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JAO:MAC/ccs

Enclosures:

Terminal Disclaimer
Request to Amend Inventorship
Petition for Extension of Time

Date: December 12, 2000

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